Letter
Circular
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(Superseding LC283)

DEPARTMENT OF COMMERCE

NATIONAL BUREAU OF STANDARDS

WASHINGTON

Optical Instruments, Refractometry, and Optical Glass: Publications (Including Those in Non-Governmental Periodicals) by Members of the Bureau Staff

December 12, 1936.

I. GENERAL INFORMATION

The publications listed herein relate to a particular field of activity at the National Bureau of Standards. For other Government publications issued by this bureau, see Circular 24 and its supplements (the first three listed in Section III of this letter circular).

Articles that have been published by the U. S. Government may be consulted in various Government-depository libraries of which there are two or more in each State. Publications marked OP are out of print and no longer available for distribution or sale. To obtain available publications, send orders with remittance to the Superintendent of Documents, Government Printing Office, Washington, D. C. (Do NOT send orders to the National Bureau of Standards, except for Letter Circulars, which may be obtained upon application without charge.) The particular series to which a Government publication belongs is indicated by the initial letter preceding the number as follows:

C, Circular;

LC, Letter Circular;

S, Scientific Paper;

RP, Research Paper.

In referring to publications, the serial letter and the number are both needed to give complete identification, and both should be used in ordering (as, for example, "National Bureau of Standards publication RP427"). Government publications from the Superintendent of Documents usually reach destinations within a

week or two. For convenience of the general public coupons (good until used in exchange for Government publications) may be purchased from his office in sets of 20 for $1.00.

Domestic remittances should be made by coupons, postal money order, express order, or New York draft payable to the "Superintendent of Documents, Government Printing Office, Washington, D. C." Postage stamps, defaced or smooth coins, or foreign money will not be accepted. Publications are forwarded under Government frank to addresses in the United States and its possessions; also to Canada, Cuba, Mexico, Newfoundland, and the Republic of Panama.

Remittances from foreign countries, with exception of those mentioned in the preceding paragraph, should include in addition to the price of the publication, about one-third of the quoted price in order to cover postage. If the amount remitted exceeds postage requirements, the balance will be refunded; or if additional postage is required notification will be made. Remittances should be made by international money order or by New York draft.

In general, reprints of the articles which have appeared in scientific periodicals, other than those of the Government, are not available for distribution. Many of the larger libraries maintain files of these scientific journals and they may be readily consulted. Local libraries not having such files available, may be able to borrow desired publications from a larger library.

LIST OF NON-GOVERNMENT PERIODICALS

Inquiries regarding the purchase of back numbers of magazines containing any of the articles listed in section IV should be addressed to the publisners. For this purpose their adaresses are given in the list which follows:

American Machinist,
McGraw Hill Publishing Co.,
330 W. 42nd Street,
New York, N.Y.

Annual Report of Compressed Gas Manufacturers Ass'n.,Inc.,
Compressed Gas Manufacturers Ass'n., Inc.,
120 West Forty-second Street,
New York, N.Y.

Army Ordnance,
The Army Ordnance Association,
Mills Building,
17th St. and Pennsylvania Ave.,
Washington, D. C.

Astronomical Society of the Pacific,
318 Merchants Exchange Bldg.,
San Francisco, Calif.

Journal of the American Ceramic Society,
2525 N. High Street,
Columbus, Ohio.

Journal of the Optical Society of America and Review of Scientific Instruments,
American Institute of Physics,
175 Fifth Avenue,
New York, N.Y.

Nature,
St. Martin's Street,
London. W.C.2, England.

The Military Engineer,
Mills Building,
17th St. and Pennsylvania Ave.,
Washington, D. C.

III. PUBLICATIONS ISSUED BY THE U.S. GOVERNMENT

Series	Price	
C24	25c.	Publications of the Bureau of Standards. 1901-25.
	25c.	Supplementary list of publications of the Bureau of Standards. July 1, 1925 - December 31, 1931.
	5c.	Supplementary list of publications of the National Bureau of Standards. January 1, 1932 - June 30, 1936.

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C27	OP	Testing and properties of optical instruments. Cir. BS, C27 (1918). 41pp. 1 illus.
C110	5c.	Specifications for marine sextants. Cir. BS, C110 (1921). 8 pp.
C389	5c.	Making of mirrors by deposition of metal on glass. Cir. BS. C389 (1931) 19 pp. 2 illus.
S110	OP	New method for determining the focal length of a converging lens. I. G. Priest. B.S. Sci. Pap., 5, 483 (1908-09) 15 pp.
S122	OP	Resolving power of objectives. P. G. Nutting. BS Sci. Pap., 6, 121 (1909-10) 5 pp. 1 illus.
S215	OP	Micrometer microscopes. A. W. Gray. BS Sci. Pap., 10, 375 (1914) 16 pp. 3 illus.
S311	OP	Axial aberrations of lenses. E. D. Tillyer and H. I. Schultz. BS Sci. Pap., 14, 341 (1918-19) 29 pp. 27 illus.
S333	OP	Optical conditions accompanying the striae which appear as imperfections in optical glass. A. A. Michelson. BS Sci. Pap., 15, 41 (1919-20) 5 pp. 4 illus.
S358	OP	Concerning the annealing and characteristics of Glass. A. Q. Tool and J. Valasek. BS Sci. Pap., 15, 537 (1919-20) 35 pp. 10 illus.

Series	Price	
S373	5c.	Characteristics of striae in optical glass. T. T. Smith, A. H. Bennett, and G. E. Merritt. BS Sci. Pap., 16, 75 (1920) 18 pp. 19 illus.
S393	10c.	Measurements of thermal dilation of glass at high temperatures. BS Sci. Pap., 16, 449 (1920) 39 pp. 21 illus. C. G. Peters and C. H. Cragoe
S461	OP	Spherical aberration of thin lenses. T. T. Smith. BS Sci. Pap., 18, 559 (1922-23) 26 pp. 15 illus.
S485	5c.	Application of the interferometer to measurements of the thermal dilation of ceramic materials. G. E. Merritt. BS Sci. Pap., 19, 357 (1923-24) 17pp. 14 illus.
S494	OP	Aberrations of long focus anastigmatic photographic lenses. A. H. Bennett. BS Sci. Pap., 19, 587 (1923-24) 54 pp. 52 illus.
S521	10c.	Measurements of the index of refraction of glass at high temperatures. C. G. Peters. BS Sci. Pap., 20, (1924-26) 25pp. 14 illus.
S550	45c.	Application of the algebraic aberration equations to optical design. I. C. Gardner. BS Sci. Pap., 22, 73 (1927-28) 131pp. 55 illus.
S572	10c.	Cause and removal of certain heterogeneities in glass. L. W.Tilton, A. N. Finn, and A. Q. Tool. BS Sci. Pap., 22,719 (1927-28) 18 pp. 11 illus.
RP52	10c.	Interference method for the determination of axial and oblique aberrations. A. H. Bennett. BS J. Research, 2,685 (1929) 18 pp. 11 illus.
RP64	10c.	Prism refractometry and certain goniometrical requirements for precision. L. W. Tilton. BS J. Research, 2, 909 (1929) 22pp. 2 illus.
RP71	5c.	Determination of the source and means of prevention of stones in glass. H. Insley. BS J. Research, 2,1077 (1929) 8pp. 9 illus.
RP97	10c.	Making the glass disk for a 70-inch telescope reflector. A. N. Finn. BS J. Research, 3, 315 (1929) 15pp. 9 illus.

Series	Price	
RP102	10c.	Representation of aberration diffraction effects by means of rotating sectors. A. H. Bennett. BS J. Research, 3, 391 (1929) 8pp. 4 illus.
RP112	5c.	Optical heterogeneity of a fused quartz disk. L. W. Tilton and A. Q. Tool. BS J. Research, 3, 619 (1929) 10pp. 2 illus.
RP219	10c.	Dimensional changes caused in glass by heating cycles. A.Q. Tool, D. B. Lloyd, and G. E. Merritt. BS J. Research, 5, 627 (1930) 20pp 7 illus.
RP262	10c.	Prism size and orientation in mininum deviation refractometry. L. W. Tilton. BS J. Research, 6, 59 (1931) 18 pp. 6 illus.
RP272	10c.	Optical coincidence gage. I. C. Gardner and F. A. Case. BS J. Research, 6, 229 (1931) 9pp. 6 illus.
RP292	10c.	Variations caused in heating curves of glass by heat treatment. A.Q. Tool and C. G. Eichlin. BS J. Research, 6, 523 (1931) 30pp. 11 illus.
RP316	5c.	Lateral chromatic aberration of apochromatic microscope systems. I. C. Gardner and F. A. Case. BS J. Research, 6, 937 (1931) 10pp. 3 illus.
RP320	5c.	Index of refraction of some soda-lime-silica glasses as a function of the composition. C. A. Faick and A. N. Finn. BS J. Research, 6, 993 (1931) 10pp. 3 illus.
RP345	10c.	Restoration of solarized ultra-violet transmitting glasses by heat treatment. A. Q. Tool and R. Stair. BS J. Research, 7, 357 (1931) 18pp. 5 illus.
RP427	5c.	Optical requirements of airplane mapping. I. C.Gardner. BS J. Research, 8, 445 (1932) 11pp. 5 illus.
RP466	5c.	Reciprocal spherical aberration of an optical system including higher orders. Harold F. Bennett. BS J. Research, 9, 187 (1932) 39pp. 11 illus.
RP467	5c.	Attachment for turning approximately spherical surfaces of small curvature on a lathe. I. C. Gardner. BS J. Research, 9, 227 (1932) 11 pp. 2 illus.

Series	Price	
RP575	5c.	Permissible curvature of prism surfaces and inaccuracy of collimation in precise minimum-deviation refractometry. L. W. Tilton. BS J. Research, 11, 25 (1933) 33 pp. 9 illus.
RP577	5c.	Viscosity of optical glass. W. P. Wadleigh. BS J. Research, 11, 65 (1933) 14pp. 6 illus.
RP626	5c.	Effect of heat treatment on the expansivity of a pyrex glass. J.B. Saunders and A. Q. Tool. BS J. Research, 11, 799 (1933) 12pp. 1 illus.
RP667	5c.	Thermal expansions of some soda-lime-silica glasses as functions of the composition. B.C. Schmid, A. N. Finn, and J. C. Young. BS J. Research, 12, 421 (1934) 8pp. 3 illus.
RP695	5c.	Variations in refractive index of CO_2-free air and a statistical correlation with solar activity. L. W. Tilton. J. Research NBS 13, 111 (1934) 14pp. 2 illus.
RP762	5c.	Index of refraction, density, and thermal expansion of some soda-alumina-silica glasses as functions of the composition. C. A. Faick, J. C. Young, D. Hubbard, and A. N. Finn. J. Research NBS 14, 133 (1935) 5pp. 4 illus.
RP776	5c.	Standard conditions for precise prism refractometry. L. W. Tilton. J. Research NBS 14, 393 (1935) 26pp. 1 illus.
RP919	5c.	Thermal control in minimum-deviation refractometry and temperature coefficients for a medium flint glass. L. W. Tilton. J. Research NBS 17, 389 (1936) 12pp. 5 illus.
RP934	5c.	Accurate representation of refractive index of distilled water as a function of wavelength. L. W. Tilton. J. Research NBS 17, 639 (1936) 12 pp. 2 illus.

IV. PUBLICATIONS IN NON-GOVERNMENT PERIODICALS

Compound lens systems. T. Townsend Smith
J. Opt. Soc. Am.
1. No. 4, 113 (1917)

A qualitative determination of the reflection coefficients of some metals. in the Schumann region. I. C. Gardner.
Astro.-Phys.J. 45, No. 1, 30 (1917).
Sci. Am. Suppl., 84, No. 2174, 140 (1917).

Optical glass. Heber D. Curtis.
Pub.,Astronomical Soc. Pacific,
31, No. 180, 77 (1919).

Apparatus for the testing of binocular telescopes
T. Townsend Smith
J. Opt. Soc. Am. 2, 3, Nos. 5-6.
76-90 (1919).

The cemented telescope objective of barium crown and flint. I. C. Gardner.
J. Opt. Soc. Am., 4, No. 5, 275 (1920).

The coincidence type of self-contained range finder.
I. C. Gardner.
J. Opt. soc. Am., 5, No. 5, 420 (1921)

Constructional data for a cemented telescope objective of barium crown and flint. I. C. Gardner.
J. Opt. Soc. Am. and Rev. Sci. Insts.,
6, No. 3, 379 (1922).

A field telemeter for approximate surveying.
I. C. Gardner.
J. Opt. Soc. Am. and Rev. Sci. Insts.,
6, No. 5, 489 (1922).

Certain effects produced by chilling glass A.Q.Tool.
J. Opt. Soc. Am. and Rev. Sci. Insts.,
8, 479 (1924).

The standardization of optical fire control instruments.
I. C. Gardner.
Army Ordinance, 5, 512 (Sept. - Oct. 1924)

Image curvature as a function of diaphragm position.
I. C. Gardner and. J. J. Arnaud.
J. Opt. Soc. Am. and Rev. Sci. Insts.,
9, No. 6, 675 (1924)

Variations in glass caused by heat treatment. A. Q. Tool.
J. Am. Ceramic Soc. 8, 1 (January 1925).

A magnifying stereoscope and camera; two instruments for airplane mapping. I. C. Gardner.
J. Opt. Soc. Am. and Rev. Sci. Insts., 11, No. 2, 195, (1925).

A modified Hartmann test based on interference. I. C. Gardner.
J. Opts. Soc. Am. and Rev. Sci. Insts., 11, No. 4, 441, (1926).

A camera for photographing the interior of a rifle barrel. I. C. Gardner and F. A. Case.
J. Opt. Soc. Am. and Rev. Sci. Insts., 12, 159 (1926).

Regarding the heat treatment of glass and its refractivity and density. A. Q. Tool, L. W. Tilton, and E. E. Hill.
J. Opt. Soc. Am. and Rev. Sci. Insts., 12, No. 4, 490 (1926).

An Optical system for reading the angular deflection of a mirror. I. C. Gardner.
J. Opt. Soc. Am. and Rev. Sci. Insts. 12, 529 (1926).

Photographing the bore of a rifle. I. C. Gardner.
The Military Engineer, 18, 480 (1926).

Making a standard of planeness. C. A. Skinner.
General Electric Rev.
29 No. 8, 528, (August 1926).

Optical methods for testing compressed gas containers. I. C. Gardner.
Fourteenth Ann. Rep., Compressed Gas Manufacturers' Assn. Inc., 24 (Jan. 1927).

The distortion of some typical photographic objectives.
A. H. Bennett.
J. Opt. Soc. Am. and Rev. Sci. Insts., 14, No. 3, 235, (1927).

The compensation of distortion in objectives for airplane photography. I. C. Gardner and A. H. Bennett.
J. Opt. Soc. Am. and Rev. Sci. Insts., 14, No. 3, 245 (1927).

A modified Hartmann test based on interference. I. C.Gardner and A. H. Bennett. (translated from paper in J. Opt. Soc. Am. and Rev. Sci. Insts. 1925)
Zeitschrift fur Instrumentenkunde, 4, No. 47, 197, (1927).

Some effects of carefully annealing optical glass.
L. W. Tilton, A. N. Finn, and A. Q. Tool.
J. Am. Ceramic Soc., 11, No. 5, (1928),

Variations in the optical density of glass. L. W. Tilton.
J. Wash. Acad. Sci., 20, No. 1, 12 (1930).

An optical coincidence gage, I. C. Gardner.
Am. Machinist 74, No. 4, 155 (1931).

An attachment for turning approximately spherical surfaces of small curvature on a lathe. I. C. Gardner.
Am. Machinist, 76, 994, (Sept. 1932).

Sunspot number and the refractivity of dry air.
L. W. Tilton.
Nature (London), 132, p. 855, (1933).